IMPLEMENTATION OF ANALOG TO DIGITAL CONVERTER FOR WATER LEAKAGE DETECTION IN PIPE LINE USING FPGA

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ABSTRACT

In this work, Analog to Digital Converter (ADC) circuit was designed to replace the Optical Spectrum Analyzer (OSA) to catch the data from the photo detector with FPGA as a control unit for water leakage detection. FPGA will receive the data and process the data to trigger an alarm for the water leakage system. DE1 board by employing VHDL language was used to obtain the data from ADC in the form of voltage. Green LED was used to indicate that the voltage has been detected. The data then will be compared with the stored data, and if the leakage occurred on the pipe line Red LED, 7 segment and buzzer will activate.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

In this chapter, overall overview of this project is presented. Also, the objectives, problem statement, scope of work and thesis outline are also included.

1.2 Project Overview

In a water system pipeline PVC material is commonly used. High speed water flow may cause breaks in PVC pipeline so that an inspection become increasingly important for both speed and flexibility so that the PVC pipeline can be used longer than their original design life. [1]

There is various inspection techniques that have been used to detect the water leakage detection such as ultrasound, radiography remove visual inspection and eddy current testing [2]. One of the technique uses is ultrasonic leak-detection equipment which identifies the sound of water escaping a pipe. These devices also can include a pinpoint and the listening devices that make contact with valves and hydrants [3]. Some of problem using ultrasonic in such pipe line inspection system is the space between the transducer and the material must be maintained constant [4]. In other application such as robotic crawler, the design presented limited of application to either horizontal or vertical pipe structure [5, 6]. Thus the improvement is introduced– using FBG sensor.